

SUNY Adirondack

Ecological Science Consortium

Holly Ahern, Associate Professor of Microbiology ahernh@sunyacc.edu

Linda Hare, Supervisor of Biology Laboratories harel@sunyacc.edu

Diane Wildey, Dean for Academic Initiatives wildeyd@sunyacc.edu

Relative risk (RR) of various known stressors to lake ecosystems measured by changes in plankton species.

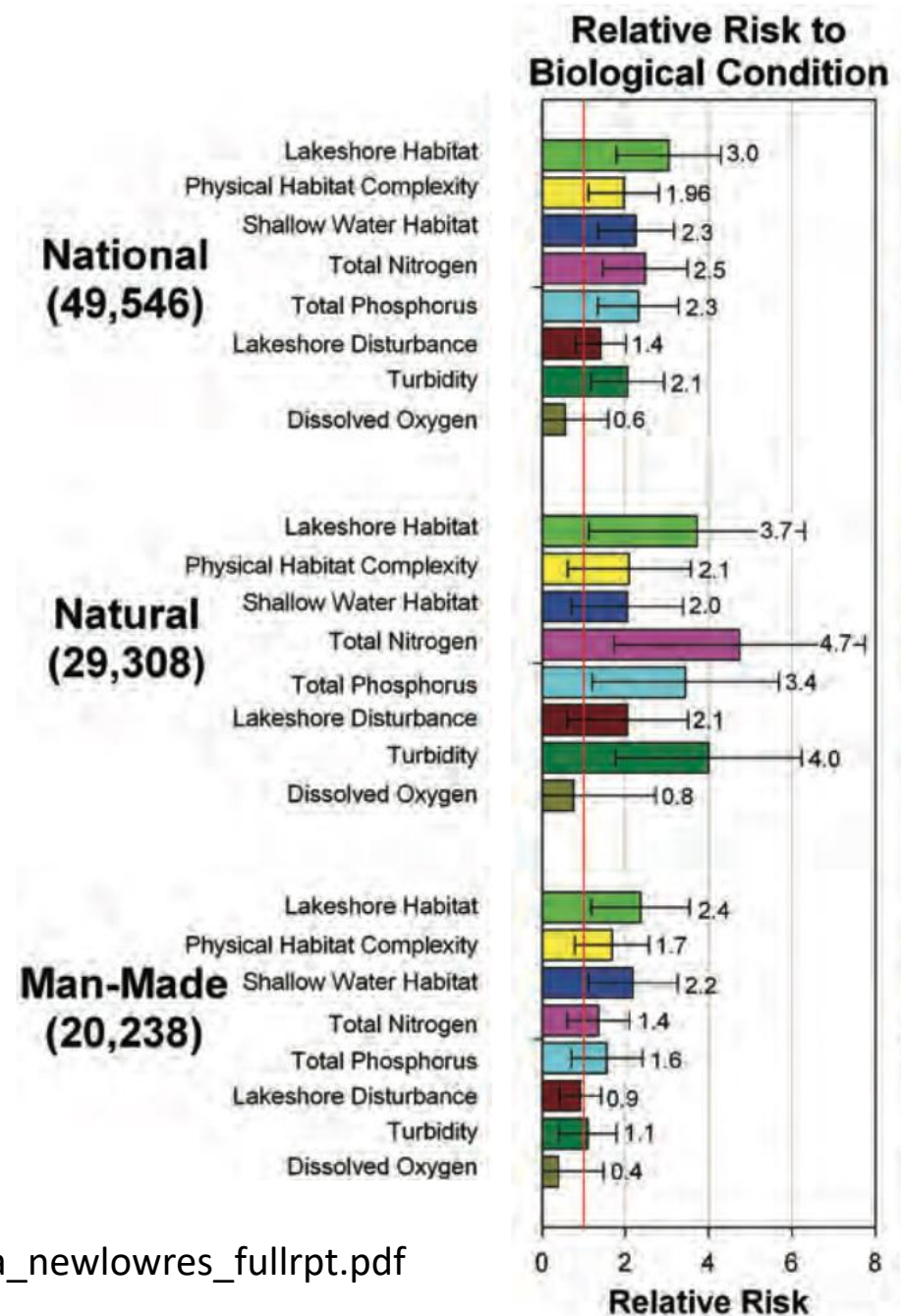
RR > 1 indicates an association between the stressor and the biological condition of the lake

Stressors:

- Lakeshore alterations
- Nutrient load
- Fecal bacteria/pathogen load

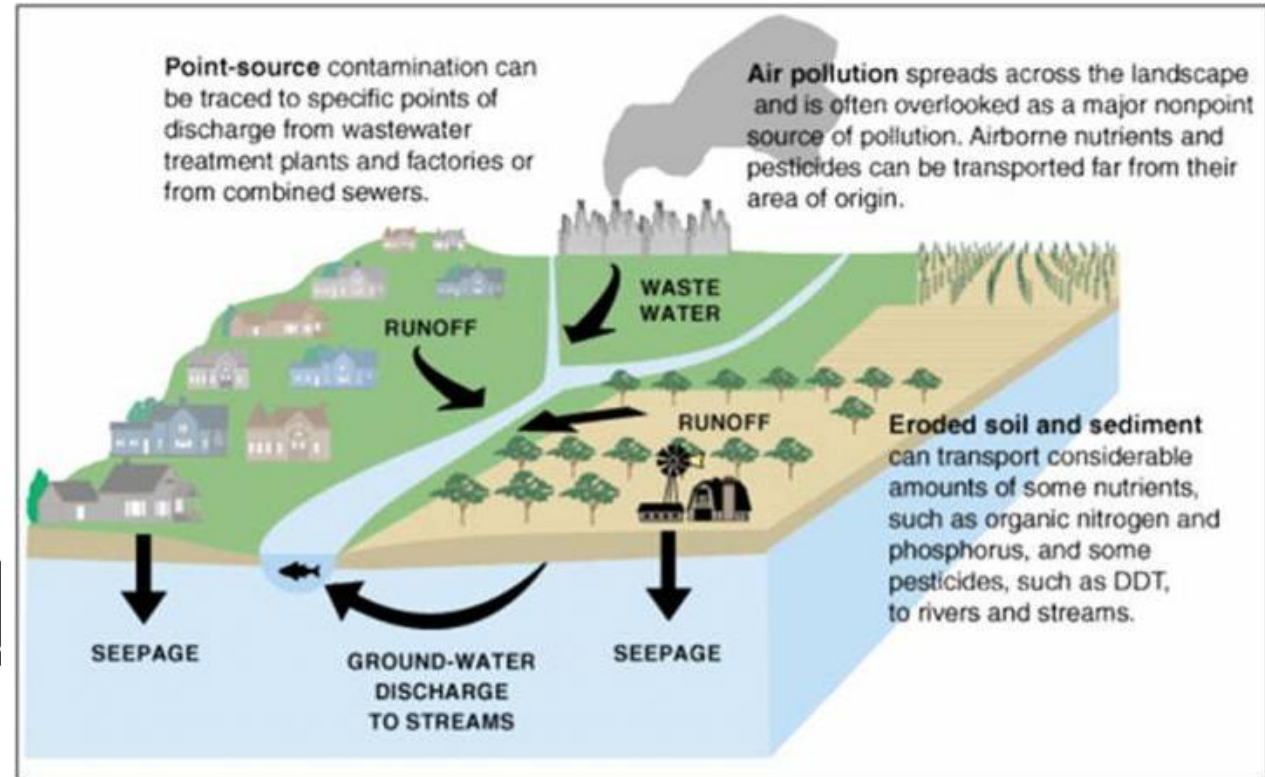
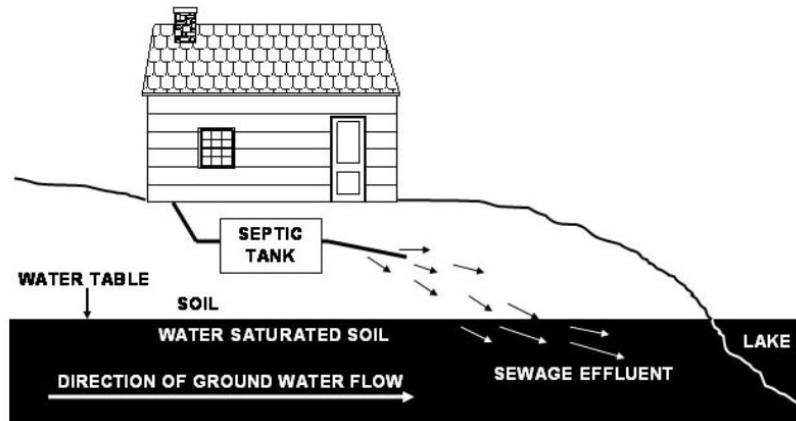
National Lakes Assessment: A Collaborative Survey of the Nation's Lakes

https://www.epa.gov/sites/production/files/201311/documents/nla_newlowres_fullrpt.pdf



SUNY ADK ESC Research Focus: Monitoring Nonpoint Source (NPS) on Small Residential Lakes in the Southern Adirondack Region.

<https://www.epa.gov/nps/guidance-monitoring-and-evaluating-nonpoint-source-watershed-projects>



- According to the EPA, states are reporting that NPS is the leading cause of declining water quality.
- For residential lakes, monitoring/evaluating NPS provides guidance for water quality improvement projects.

Detecting Failing Septic Systems on Your Lake:

A COST EFFECTIVE METHODOLOGY



Warren County Soil and Water
Conservation District
51 Elm Street
Warrensburg, NY 12885



Adirondack Community College
640 Bay Road
Queensbury, NY 12804

Overview:

- Collected near shore water samples
- Tested for several NPS indicators, including phosphorus, nitrogen, fecal bacteria (coliform and enterococci)
- Data analyzed for patterns and correlations
- Methodology modified to decrease time and cost:
 - Measure two indicators:
 - *Escherichia coli*
 - Point and nonpoint sources, natural sources
 - Free chlorine (hypochlorous acid or hypochlorite ion)
 - NPS, no natural sources
 - Both positive indicates septic source

Positive Sites Correlated with Rainfall Totals



Site #	Aug 2017	Oct 2017	May 2018	June 2018	July 2018	Aug 2018	Sept 2018	Oct 2018	Total Pos
1	--		+	--	+	+	--	--	3/7 ^b
2	--					+	--	--	1/4
3	--		+	--	+	--	--	--	2/7
4	--					+	+	--	2/4
5	--		+	--	--	--	--	--	1/7
6	+	--				--	+	--	2/5
7	+	+	+	--	+	+	--	--	5/8 ^a
8	--					+	+	--	2/4
9	--		+	+	--	+	--	--	3/7 ^b
10	--					+	--	--	1/4
11	+	--	+	--	--	+	--	--	3/8
12	--					+	--	--	1/4
13	--		+	--	--	+	+	--	3/7 ^b
14	--					+	--	--	1/4
15	--		--	--	--	+	--	--	1/7
16	+	--				--	--	--	1/5
17	--		--	--	--	+	--	--	1/7
18	--		--	--	--	--	--	+	1/7
19	--					+	--	--	1/4
20	--		+	--	--	--	--	--	1/7
21	--					+	--	--	1/4
22	+	+	+	--	+	+	--	--	5/8 ^a
23	--					+	--	--	1/4
24	+	--	--	--	--	+	--	--	2/8
Total Pos	6/24	2/6	9/13	1/13	4/13	18/24	4/24	1/24	
Percent	25%		69%	7%	31%	75%	17%	4%	



Times Site was Positive for Both Indicators

Take Aways:

- Observation: Two sites were positive for both NPS indicators >60% of testing dates.
- Indication: Presence of both indicators at a sampling site consistently over time may indicate areas along lake shoreline where NPS from septic system effluent originates.
- Observation: Testing sites positive for both indicators -- in particular free chlorine -- showed a strong positive correlation with months with highest rainfall totals.
- Indication: NPS contaminants are entering the lake through groundwater and surface water